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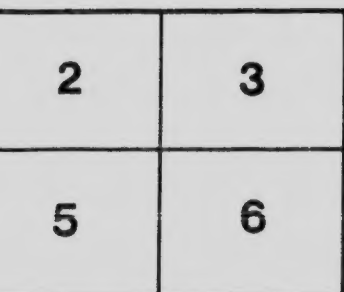
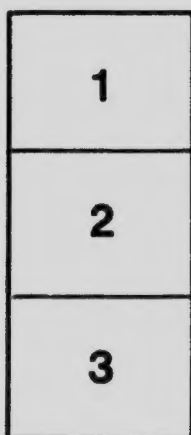
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APPLE SCAB

(*Venturia inaequalis* Aderh.)

BY

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Apple Scab on Fruit (after Craig).

DOMINION EXPERIMENTAL FARMS.

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Besides the actual injury, which is caused by this common disease, on the fruit and leaves of the apple, resulting in unsightly appearance of the fruit and reduced yields, we have the following important points to bear in mind:—

In the Dominion Inspection and Sale Act, Section IX, referring to Fruit Marks and Packages are certain references to Scab, viz.:—

1. Fruit may only be graded as FANCY QUALITY, when it is free from scab.
2. Fruit may only be graded as No. 1 QUALITY when not less than 90 per cent of the apples are free from scab.

Think then what this means. You can put your fruit into a higher grade, and get a better price for it, if free from scab. Surely then, it is worth while to know all about the causes of the disease, how it may be quickly recognized, and, most necessary of all, how it may be controlled or at any rate reduced to a minimum in your orchard in a perfectly practicable way.

Apple scab has been generally considered to be the most injurious disease with which the apple grower has to contend. A loss of from 25 per cent to 50 per cent of an entire crop has been recorded in some seasons, due to its ravages, and when we consider the value of the total apple crop of Canada, the toll paid to the microscopic plant causing this disease is enormous.

APPEARANCE AND CAUSE.

Every one who has ever seen an apple, much more grown it, must have noticed occasionally dark, more or less circular spots on its surface, deep olive green in colour, sometimes with a broken skin around an almost black centre, causing disfigurement and cracking in bad cases. (See frontispiece illustration.) This scabbiness, as it is called, is a diseased condition brought about by a minute microscopic plant—a fungus—which grows within the surface tissues of the apple. As a result the fruit is spoiled in appearance, and its keeping qualities are much impaired.

The fungus also attacks the twigs and leaves, covering part of the surfaces of the latter with a thick velvety coat, varying in colour from dark olive green to black. In the early stages the disease appears as isolated spots circular in shape, but later becoming irregular and running together. The leaves may also become curled and wrinkled. The disease on the leaves reduces the active leaf surface of the tree, and as they play such an important part in the manufacture of food materials for the growth and development of the plant, it results in a stopping of wood and twig formation and a premature falling of the fruit.

CONTROL MEASURES.

From a careful study of the disease we find that, during the summer, Apple Scab is spread on the leaves, fruit and twigs by little pear-shaped spores, which are produced on the olive green velvety coverings referred to previously. In this stage, the fungus is an active parasite living in the growing fruit and leaf tissues. In the autumn, when the affected leaves fall to the ground, the fungus goes on growing on the dead leaves, but instead of producing the little pear-shaped spores, it forms well-protected globular receptacles inside the dead leaf. In this condition the fungus lives over the winter. In the following spring the thick walls of the fruiting body burst, and another kind of spore becomes liberated. These are blown about by the wind, and are capable of reproducing the scab attack on the young foliage and fruit.

We have thus learned that the scab spots on the leaves and fruits bear spores which spread the disease in summer (summer spores), and that the fungus lives over winter on the dead leaves, producing winter spores. These observations lead to the adoption of the following means of control:—

Remove and destroy by burning, if at all possible after harvest, all diseased material, especially the dead leaves on the ground. Remember that in doing you are taking the first steps to prevent the trees from becoming infected through the dispersal of winter spores in the following spring.

During the winter, when the apple trees are being cleaned up to remove hibernating insects and San José scale, the trees should be given a good spraying with lime-sulphur wash (dormant spray), so that, in the event of a spell of mild weather before the first spray is applied in the spring, all the spores of the fungus, which would otherwise germinate, will be killed.

To prepare this lime-sulphur wash, the following proportions are used:—

Lime.	20 lb.
Powdered sulphur.	15 lb.
Water.	To make up 40 gal.

Slake the lime with just enough water to reduce it to a fine powder; add the sulphur by dusting it over the lime while slaking, and mix well; then add only so much hot water as is necessary for easy stirring, and boil for at least an hour. When thoroughly cooked, strain through sacking, add enough water to make up to 40 gallons, and apply hot if possible.

It is, however, doubtful whether even the most careful attention to the destruction of infected material, such as twigs, etc., and the winter spray will together prevent the reappearance of scab in orchards once badly infected. It will, therefore, be necessary to again spray the trees thoroughly at various periods during the season's growth.

We must spray again (1) just when the leaf buds are opening, (2) just before the blossoms open, and (3) as soon as the blossoms fall.

For these three applications it is generally recommended to use poisoned lime-sulphur wash.

The poison is added to give to the fungicide an insecticidal action also at the one application.

For this purpose add from 2 to 3 pounds of Arsenate of lead to every 40 gallons of spray. Always add the arsenate of lead to the lime-sulphur solution after you have made it up to the strength required for the particular application.

The lime-sulphur wash employed for these sprayings should be considerably weaker in strength than the so-called dormant or winter spray, the composition of which has already been given.

We should, however, commence the preparation of sprays of the required strength by making up the usual dormant spray. This latter in its full strength would injure the foliage and young fruit and would, therefore, do as much or even more damage than the scab fungus. The weaker solution is prepared from the stronger by diluting with water. In order to do this accurately it is best to use a hydrometer, an instrument similar in appearance to a thermometer, which can be procured through any druggist at the cost of about \$1. When the dormant spray is ready prepared and cool, drop the hydrometer into it; it will sink to a certain depth, and will register the strength of the solution by the scale reading of the instrument, standing at the level of the liquid. Below is given a list of the various strengths of the solutions to be applied at the several periods. To obtain the correct dilution, carefully note the reading of the hydrometer. For example, the dormant spray registers, say, a density of 1.018 and you require a dilution registering only a density of 1.009. To ascertain the quantity of water to add, divide the decimals of the strong solution (here .018) by the decimals of the required weaker solution (here .009); this will give you the figure 2. You should therefore double the quantity of water already used. To make the dormant spray you used 40 gallons of water, and found the index to read 1.018. If you add another 40 gallons of water the hydrometer will register 1.009, or the strength aimed at.

The following table shows the required dilutions or strengths of the wash to be used at the various periods stated:—

(a) Just before the leaf buds open.	Density 1.030
(b) Just before the blossoms open.	" 1.010
(c) As soon as the blossoms fall.	" 1.009
(d) And at intervals of 15-20 days after this, if scab is very prevalent, at a density of.	1.009

The dormant spray ("Niagara Brand") will generally register a density of about 1.280. To make the sprays required, calculate as follows:—

Original strength.	Decimal.	Required strength.	Decimal.	Calculation.	Quantity of concentrate. Gal.	Quantity of water. to add. Gal.
1.280	.280	1.030	.030	$.280 \div .030 = 9.3$	1	9.30
1.280	.280	1.010	.010	$.280 \div .010 = 28$	1	28.00
1.280	.280	1.009	.009	$.280 \div .009 = 31$	1.	31.00

The dilution may, of course, be obtained by taking a small quantity of concentrate (dormant) spray, and gradually pouring into it water, until the hydrometer registers the required strength.

Keep the dormant spray in one barrel. When preparing dilutions pour one or two gallons into another barrel and then add the required quantity of water.



